Pharmacology

Introduction

Key Topics

- How are drugs described and referenced?
- What are the relevant drug laws and regulations?
- What are the factors affecting how drugs are given?
- What are some of the key terms?

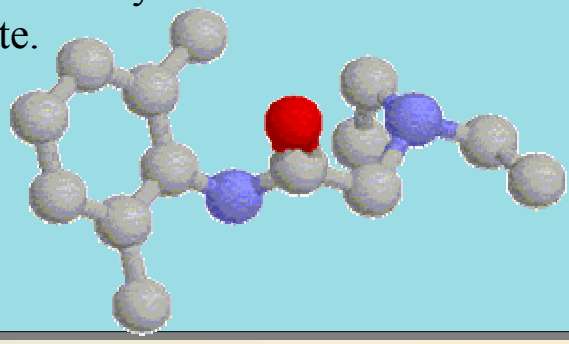
Drug Descriptions

- Names
- Sources
- Forms
- Reference Materials
- Components of Drug Profiles

Drug Names

- Chemical Name: 2-(diethylamino)-2’,6’-acetooxylid monohydrochloride monohydrate.

Not Particularly Useful!



Drug Names

- Generic Name: lidocaine hydrochloride
- Official Name: Lidocaine Hydrochloride, USP
- Brand (Trade) Name: Xylocaine®

Much More Useful

Drug References

- USP
- PDR
- Drug Inserts
- Nursing Drug References
- Pocket Field Guides
- Digital Guides
  - Jeff's Pharmacology Review

http://www.templejc.edu/ems/drugs/PharmIndex.html

Components of a Drug Profile

- Names
- Classification (including prototype)
- Mechanism of Action
- Kinetics
- Indications
- Contraindications
- Side Effects
- Interactions
- Routes of Administration
- Dosage
- How Supplied
- Special Considerations

Drug Laws

- Pure Food and Drug Act of 1906
- Harrison Narcotic Act of 1914
- Federal Food, Drug and Cosmetic Act of 1938
  - Durham-Humphrey Amendments
- Comprehensive Drug Abuse Prevention and Control Act of 1970

Controlled Substances

Schedule I	High abuse potential with risk of severe dependence; no medical use.
Schedule II	High abuse potential with risk of severe dependence. Some medical indications
Schedule III	Moderate abuse potential with risk of moderate to low physical dependence and/or high psychological dependence.
Schedule IV	Low abuse potential with limited risk of dependence.
Schedule V	Lowest abuse potential with limited dependence risks.

State and Local Laws

- 'Scope of Practice' Laws
- Responsibility vs Authority of Medical Direction

Drug Standardization

- Assays
- Bioequivalence
- Bioassay
- USP is the official standard

Research and Development

- Key points from FDA handout
  - Purpose?
  - What are controls?
  - What are the phases?
  - What is an IND? An NDA?
  - Why is skepticism important?

Handout Source: http://www.fda.gov/fdac/special/newdrug/testing.html

Six Rights of Medication Administration

- Right Medication
- Right Dose
- Right Time
- Right Route
- Right Patient
- Right Documentation

Pregnancy Considerations

- Increased maternal HR, CO and blood volume
  - May affect absorption, distribution, effectiveness
- Drugs may cross placenta
- Drugs may cross into breast milk
- Tertatogens

Pregnancy Categories

- A: controlled studies in pregnancy (<1 %).
- B: animal studies show no risk; Inadequate human data.
- C: animal studies show risk, inadequate human data.
- D: human data show risk, benefit may outweigh risk.
- X: animal or human data positive for risk. Use unwarranted.

Pediatric Considerations

- ⇓ Oral absorption
- Thinner skin (⇑ topical absorption)
- ⇓ Plasma protein concentration
  - ⇑ Free protein-bound drug availability
- ⇑ Extracellular fluid in neonate
- Altered metabolic rates
- ⇓ Elimination/metabolism
- BSA/weight based dosing important!

Geriatric Considerations

- ⇓ Oral absorption
- ⇓ Plasma protein concentration
- ⇓ Muscle mass, ⇑ body fat
- ⇓ Liver/renal function
- Multiple drugs
- Multiple diseases

Some Terminology

- Receptor affinity
- Efficacy
- 1° vs. 2nd messengers
- Up vs. down receptor regulation
- Agonist vs. antagonist
- -lytic vs. -mimetic

- Inhibition (antagonism)
  - Competitive vs. noncompetitive vs. irreversible
- Allergic reaction
- Idiosyncrasy
- Tolerance

More Terminology

- Cross tolerance
- Tachyphylaxis
- Cumulative effect
- Dependence
- Drug interactions
- Summation (1+1=2)
  - Additive effect
- Synergism (1+1=3)
- Potentiation
- Interference

Basics of Drug Classification

- Knowledge grouping
- Prototype drug
- Predictive value

Drug Classification

- By chemistry
  - electrolytes
- By mechanism
  - Beta blockers
  - benzodiazepines
- By disease
  - antihypertensives
  - Antiemetics

Resources

- Clinical Pharmacology 2000
  - http://cp.gsm.com/default.asp
- University of Kansas Medical Center
  - http://www.kumc.edu/AMA-MSS/study/pharmacology.htm
- Infomed Online!
  - http://www.infomed.org/index-e.html
- Mosby's GenRX
  - http://www.genrx.com/genrxfree/Top_200_2000/Top_200_2000.html

Resources

- Hardin MD (Meta-Directory)
  - http://www.lib.uiowa.edu/hardin/md/pharm.html
- Top 200 Prescription Drugs
  - http://www.rxlist.com/top200.htm
- Medline Plus: Consumer Information on Prescription Drugs
  - http://www.nlm.nih.gov/medlineplus/druginformation.html
- FDA Online (Testing Drugs in People)
  - http://www.fda.gov/fdac/special/newdrug/testing.html